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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,207	02/13/2004	Bjorn Fischer	543822004500	2480

25227 7590 04/08/2005

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EXAMINER
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DANG, PHUC T

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 04/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AN

<b>Office Action Summary</b>	Application No. 10/777,207	Applicant(s) FISCHER ET AL.	
	Examiner PHUC T. DANG	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on election filed on February 14, 2005.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 12-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-11 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>102704</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### **Election/Restrictions**

1. Applicant's election filed on February 14, 2005 has been acknowledged.

In election, Applicants elected Group I (claims 1-11) for examining at this time and withdrawn Group II (claims 12-14).

Applicants have the right to file a divisional application covering the subject matter of the non-elected claims of Group II (claims 12-14).

2. Claims 1-14 are currently pending in the application.

### **Oath/Declaration**

3. The oath/declaration filed on February 13, 2004 is acceptable.

### **Priority**

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### **Information Disclosure Statement**

5. The office acknowledges receipt of the following items from the applicant:

Information Disclosure Statement (IDS) filed on October 27, 2004 and October 12, 2004.

The item of Reference No. 2 (German Office Action dated January 28, 2004) listed on IDS filed on October 27, 2004 has not been acknowledged because the document has not been submitted in a separate paper. Applicants are required to submit this document in response to the next Office action if the Applicants would like the Examiner considered.

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The Information Disclosure Statement (IDS) filed on October 12, 2004 does not match with the Application No. 10/777,207 (Its No. 10/787,248). Corrections are made if necessary.

### **Specification**

6. The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### **Claim Rejections-35 USC § 112**

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and

distinctly claiming the subject matter which the application regards as his invention.

7. Claims 7-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

In claims 7-8, the limitation of "a trench capacitor of a memory cell" is indefinite since the trench capacitor is not suggested in the independent apparatus of the above claim 1.

In claims 9-11, the limitation of "isolation trench and trench bottom of the trench capacitor" is indefinite since the trench capacitor is not suggested in the independent apparatus of the above claim 1.

### **Claim Rejections - 35 USC § 103**

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3 and 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morris (U.S. Patent No. 4,200,474) in view of Sato et al., hereinafter "Sato" (U.S. Patent No. 5,238,857).

Regarding claim 1, Morris discloses a semiconductor device, comprising:

a first doping region (11, Fig. 3), which has a first conduction type (p-type);

a second doping region, (12, Fig. 3), which has the first conduction type (p-type)

and is spaced apart from the first doping region (11, Fig. 3);

a channel region (Fig. 3), which lies between the first and second doping regions; and

a gate structure (28, 27, 24, Fig. 4) provided above the channel region, wherein the gate structure having a first gate dielectric (24, Fig. 4) made of a first material with a first thickness and a first dielectric constant, which is situated directly above the channel region, and an overlying second gate dielectric (27, Fig. 4) made of a second material with a second thickness and a second dielectric constant, which is significantly greater than the first dielectric constant [col. 3, lines 6-14], and

the first thickness of the first gate dielectric (24, Fig. 4) and the second thickness of the second gate dielectric (27, Fig. 4) configured such that the corresponding thickness of gate structure with the first gate dielectric (24, Fig. 4), to obtain a same threshold

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voltage, is at least of a same magnitude as a thickness equal to sum of the first thickness and the second thickness [col. 5, lines 3-18]

Morris discloses all the features of the claimed invention as discussed above, but does not disclose a channel region has a second conduction type.

Sato, however, discloses a channel region has a second conduction type [col. 3, lines 34-39].

It would have been obvious to one having ordinary skilled in the art at the time the invention was made to modify the teaching of Sato to Morris discussed above such that a channel region has a second conduction type for a purpose of maintaining a satisfactory break down voltage.

Regarding claims 2-3, Morris discloses wherein the first material is silicon dioxide and the second material is a transition metal oxide which is a binary metal oxide selected from the group of  $\text{Al}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$ ,  $\text{La}_2\text{O}_3$ ,  $\text{TiO}_2$ ,  $\text{ZrO}_2$ ,  $\text{HfO}_2$  [col. 2, lines 27-40].

Regarding claim 5, Morris discloses wherein a field-effect transistor is involved [col. 1, lines 12-14].

Regarding claim 6, Sato discloses a parasitic field-effect transistor is involved [col. 3, lines 4-9].

It would have been obvious to one having ordinary skilled in the art at the time the invention was made to modify the teaching of Sato to Morris discussed above such that a parasitic field-effect transistor is involved for a purpose of maintaining a satisfactory break down voltage.

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### **Allowable Subject Matter**

9. The following is a statement of reason for the indication of allowable subject matter:

Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

None of the Prior Art made of record discloses the gate structure has a third gate dielectric made of silicon dioxide, which is provided above the second gate dielectric as cited in claim 4.

Claims 7-11 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112 set forth in this Office action.

### **Conclusion**

10. **Applicants are advised to cancel the non-elected claims of group II (claims 12-14) in response to the next Office action if the application is considered to be allowed.**

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuc T. Dang whose telephone number is (571) 272-1776. The examiner can normally be reached on 8:00 am-5:00 pm.

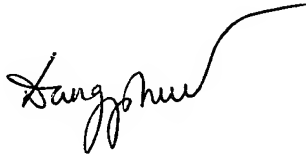
12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and After Final communications.

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13. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Phuc T. Dang

PD

A handwritten signature in black ink, appearing to read 'Phuc T. Dang', with a long, sweeping horizontal stroke extending to the right.

Primary Examiner

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